WHAT IS CLAIMED IS:

1. A method for measuring a mechanical property of a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the method comprising:

altering the transmural force to obtain an altered transmural force;

measuring local deformation of the vascular wall resulting from physiologic pressures with the altered transmural force; and

determining a value for the mechanical property based on a measured amount of local deformation.

2. The method as claimed in claim 1, wherein the mechanical property is a non-linear elastic property of the vascular wall.

3. The method as claimed in claim 1, wherein the step of measuring includes the step of non-invasively, ultrasonically imaging the vascular wall.

4. The method as claimed in claim 1, wherein the step of altering includes the step of reducing the transmural force to obtain a reduced transmural force.

5. The method as claimed in claim 4, wherein the step of reducing includes the step of applying an external pressure to the vascular wall.

6. The method as claimed in claim 5, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

7. The method as claimed in claim 4, wherein the step of reducing includes reducing an internal pressure to the vascular wall.

8. The method as claimed in claim 1, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

9. The method as claimed in claim 1, wherein the step of determining includes the step of directly estimating strain of the vascular wall.

10. A method for measuring a mechanical property of a vascular wall, the vascular wall being characterized by a relationship of arterial pressure versus strain that exhibits a relatively large slope under physiologic pressure caused by an arterial pressure pulse having a first mean arterial pressure and that exhibits a relatively small slope under physiologic pressure caused by an arterial pressure pulse having a second mean arterial pressure, the method comprising:

altering the first mean arterial pressure to obtain the second mean arterial pressure;

measuring local deformation of the vascular wall at the second mean arterial pressure; and

determining a value for the mechanical property based on the measured amount of local deformation.

11. The method as claimed in claim 10, wherein the step of measuring includes the step of non-invasively, ultrasonically imaging the vascular wall.

12. The method as claimed in claim 10, wherein the step of altering includes the step of reducing the first mean arterial pressure to obtain the second mean arterial pressure.

13. The method as claimed in claim 12, wherein the step of reducing includes the step of applying an external pressure to the vascular wall.

14. The method as claimed in claim 13, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

15. The method as claimed in claim 12, wherein the step of reducing includes reducing an internal pressure to the vascular wall.

16. The method as claimed in claim 10, wherein the step of determining includes the step of directly estimating strain of the vascular wall.

17. A method for determining health of a vascular structure including a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the method comprising:

altering the transmural force to obtain an altered transmural force;

measuring local deformation of the vascular wall resulting from physiologic pressures with the altered transmural force; and

determining the health of the vascular structure based on the measured amount of local deformation.

18. The method as claimed in claim 17, wherein the step of measuring includes the step of ultrasonically imaging the vascular wall.

19. The method as claimed in claim 17, wherein the step of altering includes the step of reducing the transmural force to obtain a reduced transmural force.

20. The method as claimed in claim 19, wherein the step of reducing includes the step of applying an external pressure to the vascular wall.

21. The method as claimed in claim 20, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

22. The method as claimed in claim 19, wherein the step of reducing includes reducing an internal pressure to the vascular wall.

23. The method as claimed in claim 17, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

24. The method as claimed in claim 17, wherein the step of determining includes the step of directly estimating strain of the vascular wall.

25. A system for measuring a mechanical property of a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the system comprising:

means for altering the transmural force to obtain an altered transmural force;

means for measuring local deformation of the vascular wall resulting from physiologic pressures with the altered transmural force; and

means for determining a value for the mechanical property based on the measured amount of local deformation.

26. The system as claimed in claim 25, wherein the mechanical property is a non-linear elastic property of the vascular wall.

27. The system as claimed in claim 25, wherein the means for measuring includes means for non-invasively, ultrasonically imaging the vascular wall.

28. The system as claimed in claim 25, wherein the means for altering includes means for reducing the transmural force to obtain a reduced transmural force.

29. The system as claimed in claim 28, wherein the means for reducing includes means for applying an external pressure to the vascular wall.

30. The system as claimed in claim 29, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

31. The system as claimed in claim 28, wherein the means for reducing includes means for reducing an internal pressure to the vascular wall.

32. The system as claimed in claim 25, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

33. The system as claimed in claim 25, wherein the means for determining includes means for directly estimating strain of the vascular wall.

34. A system for measuring a mechanical property of a vascular wall, the vascular wall being characterized by a relationship of arterial pressure versus strain that exhibits a relatively large slope under physiologic pressure caused by an arterial pressure pulse having a first mean arterial pressure and that exhibits a relatively small slope under physiologic pressure caused by an arterial pressure pulse having a second mean arterial pressure, the system comprising:

means for altering the first mean arterial pressure to obtain the second mean arterial pressure;

means for measuring local deformation of the vascular wall at the second mean arterial pressure; and

means for determining a value for the mechanical property based on the measured amount of local deformation.

35. The system as claimed in claim 34, wherein the means for measuring includes means for non-invasively, ultrasonically imaging the vascular wall.

36. The system as claimed in claim 34 wherein the means for altering includes means for reducing the first mean arterial pressure to obtain the second mean arterial pressure.

37. The system as claimed in claim 36, wherein the means for reducing includes means for applying an external pressure to the vascular wall.

38. The system as claimed in claim 37, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

39. The system as claimed in claim 36, wherein the means for reducing includes the means for reducing an internal pressure to the vascular wall.

40. The system as claimed in claim 34, wherein the means for determining includes means for directly estimating strain of the vascular wall.

41. A system for determining health of a vascular structure including a vascular wall which deforms in response to a transmural force under usual physiologic pressures, the system comprising:

means for altering the transmural force to obtain an altered transmural force;

means for measuring local deformation of the vascular wall resulting from physiologic pressures with the altered transmural force; and

means for determining the health of the vascular structure based on the measured amount of local deformation.

42. The system as claimed in claim 41, wherein the means for measuring includes means for non-invasively, ultrasonically imaging the vascular wall.

43. The system as claimed in claim 41, wherein the means of altering includes means for reducing the transmural force to obtain a reduced transmural force.

44. The system as claimed in claim 43, wherein the means for reducing includes means for applying an external pressure to the vascular wall.

45. The system as claimed in claim 44, wherein the external pressure is substantially equal to a baseline internal pressure and wherein the vascular wall deforms by pulse pressure during a cardiac cycle.

46. The system as claimed in claim 43, wherein the means for reducing includes means for reducing an internal pressure to the vascular wall.

47. The system as claimed in claim 41, wherein the vascular wall deforms a relatively small amount in response to a transmural force under usual physiologic pressures and a relatively large amount in response to physiologic pressures with the altered transmural force.

48. The system as claimed in claim 41, wherein the means for determining includes means for directly estimating strain of the vascular wall.

49. The method as claimed in claim 1, wherein the local deformation is an intramural deformation.

50. The method as claimed in claim 10, wherein the local deformation is an intramural deformation.

51. The method as claimed in claim 17, wherein the local deformation is an intramural deformation.

52. The system as claimed in claim 25, wherein the local deformation is an intramural deformation.

53. The system as claimed in claim 34, wherein the local deformation is an intramural deformation.

54. The system as claimed in claim 41, wherein the local deformation is an intramural deformation.